

# **Abstract of Japanese Patent Office Gazette**

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## **RESIN-SEALED SURFACE-MOUNTING SEMICONDUCTOR DEVICE**

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**PURPOSE:** To reduce the size and thickness of the title semiconductor device while a mechanism which prevents the deformation of external electrodes or fluctuation of the electrodes at the machining time is secured by using the rear sections of inner leads connected to internal wiring as external electrodes at the time of directly mounting the semiconductor device.

**CONSTITUTION:** A semiconductor chip 1 is placed on the die pad 2 of a lead frame. After electrically connecting the chip 1 to inner leads 6, the rear of which become external electrodes 8, through bonding wires 3, the upper part is sealed with a resin. Similarly, the chip 1 is electrically connected to the leads through bumps 4. In other words, the rear of the electrically connected inner leads 6 are used as the electrical connecting sections 8 of the semiconductor device to the outside. Therefore, the size of the semiconductor device can be reduced to nearly the same size as that of the chip 1. In addition, the thickness of the semiconductor device can also be reduced.

**EMBODIMENT:** As shown in Fig.2A a semiconductor chip 1 placed on a 0.1-0.3mm thick lead flame die pad 2 is electrically connected with an inner lead 6 by bonding wire 3 by using a lead frame. The inner lead 6 has an outer electrode 8 on its rear. Then the structure is sealed with sealing material such as epoxy resin. A rear resin portion is cut into the structure as shown in Fig.2B. Plating such as soldering is performed on an exposed part of the outer electrode 8. (See Fig.2C.) After extra portions of an outer lead 7 are trimmed by such as metal mold, the structure as shown in Fig.2D is obtained. Alternatively, the same procedure except that resin sealing is performed with a metal mold having cavity on its upper part only results in the structure as shown in Fig.3A. After the plating 9 and the outer lead 7 are trimmed, the structure as shown in Fig.3B is obtained. The second procedure may need the pretreatment, i.e. trimming of the extra portions by high-pressure water, but may not need to cut the hard sealing resin as the first procedure requires.